

# THE SCIENCE NEWS-LETTER

A Weekly Summary of Current Science

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## A QUEER KETTLE

By Dr. Edwin E. Slosson

"If a kettle of water be placed on a fire there is a chance, though an exceedingly small one, that the water will freeze." This startling saying, quoted from Planck by Paul R. Heyl of the Bureau of Standards, is an admirable illustration of how much the scientific viewpoint of the twentieth century differs from that of the nineteenth.

We were taught in school that heat always flows from a hot to a cold body, and we verified this law for ourselves frequently and sometimes unpleasantly. If we touched a boiling tea-kettle, the heat flowed into our finger before we could snatch it away. If we touched a lump of ice the heat ran into the ice and the finger became cold.

Twentieth century physicists do not presume to contradict these facts, nor do they propose to abrogate the law, yet they point out that the law is not an absolute rule but a statistical average, based upon the calculation of probabilities. It holds in the long run and on the whole, yet there may be, in fact must be, local and temporal exceptions.

Just so a man might say of the Hudson River tunnel that in the morning the crowd flows from New Jersey to New York, and in the evening from New York to New Jersey. Quite true, yet if we look more closely we observe that a minor proportion of passengers are going in the opposite direction from the majority, both morning and evening.

Now from the point of view of the physicist the difference between a hot body and a cold body is that in the former the molecules are moving about more rapidly on the average. But the molecules of both are moving with various and varying velocities, and when the two bodies are in contact they influence one another, both ways. Heat is continuously flowing from the cooler to the warmer, running up hill, so to speak, but this minor effect is masked by the overwhelming current of heat running down to the cooler body.

Nevertheless, as Dr. Heyl points out, this involves the admission that perpetual motion, which was anathema to nineteenth century science, is theoretically possible on a very small scale, although it is practically impossible on a large scale. In other words, the heat might all run from the kettle of water to the fire -- only never does.

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## WELL BRED AMERICANS CONQUER ENVIRONMENT

The story of America, with its many interwoven threads of migration, demonstrates that good blood persistently seeks and finds for itself a desirable environment, while descendants of poorer stock settle down in less desirable places with a shrug of the shoulders.

This important role that inheritance plays in shaping the careers of individuals and families was stressed by Dr. Arthur H. Estabrook, in his recent presidential address before the Eugenics Research Association.

Dr. Estabrook pointed out that very definite strains of people have been carried across the continent and deposited here and there by the shifting process of the pioneer movements.

"Studies seem clearly to indicate that the early pioneers in the settlement of the wilderness were from stocks of superior ability and physique," he stated. "As they went westward, the more energetic were continually seeking to reach regions and areas that were capable of development, and if by chance they became pocketed in undesirable places, the energetic stocks and individuals again moved on, leaving the less active in the areas where there was poorer chance for development."

Describing the static conditions in places where social and mental defectives have become established and multiplied, Dr. Estabrook showed that there is no blood with ability in such places, so that schools and community organizations have little influence in raising the social and economic level. Poor stocks continue to mate with poor stocks and offspring with only low mental equipment result.

If immigration were to cease, the slums of a city would in time correspond exactly to these rough, unproductive rural sections, he declared, continuing:

"This situation exists now in the slums of some of the smaller, long settled cities along the Hudson River, where little immigration has taken place in recent years."

More study of the background of early Americans was urged, in order to show the influence of superior strains of inheritance and more particularly the sinister influence of mental and social defectives.

Before the year 1700, thousands of convicts and wanderers were sent to this country from England, some historians estimating the number as high as 100,000. But the histories of these people have not been traced back to their old world homes.

Dr. Estabrook raised the question of whether some of the wanderlust, the mental defect, the social inadequacy, as shown by such large groups as the Tribe of Ishmael of Indiana and western states can be explained by the influence of some few mental defectives who were among the paupers, idlers, and ruffians picked up in England to fill the quotas of population guaranteed by the Virginia Company.

"The tribe of Ishmael," he said, "has been traced genealogically to Virginia and the Carolinas in the earlier periods, but no further analysis can be made, as no records have been located in this country which would give the social or political

classification minutely of early migrants into Virginia. Search for such data should be instituted in England. The Old Bailey and other prison records, ships' manifests, and the like are available there."

Records showing thenames and histories of all persons sent to this country in pre-Revolutionary days under any form of servitude would be of great value in charting the trends in American heredity, Dr. Estabrook pointed out.

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#### SUPERIOR CHILDREN PUSHED TOO RAPIDLY, WARNS EDUCATOR

Children who show a natural tendency to be superior mentally should not be pushed ahead through school grades too rapidly is the warning given by Dr. William T. Root, professor of Educational Psychology at the University of Pittsburgh.

The great trouble with home training is the fact that so many parents like to point with pride to the school achievements of their children, and lose sight of the great importance of a balanced program for the child, says Dr. Root in a report in a recent issue of Childhood Education. A balanced program, he declares, must include plenty of play and social contacts with other children of the same age.

Dr. Root urges that health and physical adjustment of the mentally superior child should be given first consideration, and that its superior learning ability should be utilized by more extensive and intensive study rather than by advancing pupils several grades in school. Study of art or music or some other useful subject in which the child happens to be interested is suggested as a means of keeping the bright child occupied.

In warning parents and teachers against grouping superior children in with older, more socially mature children, he points out that the child is so easily molded in the early and formative years that it should be given every opportunity to develop those worthwhile traits of character which can be brought out only by careful social contacts and avoidance of instilling intellectual priggishness.

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#### CATERPILLARS CAUSE POISONING

Along with mosquitoes, chiggers and poison ivy, vacationists and campers are warned to be on their guard against caterpillars of the sort popularly known as fuzzy.

Dr. George E. Beyer of the Louisiana state board of health has made a survey of the caterpillar situation in that region which shows that some species are actually seriously poisonous. The spines or hairs of the common "wooly bear" have an irritating effect on the skin somewhat similar to nettles that is fairly well known, while another culprit is the greyish caterpillar of the widely distributed tussock moth with its tufts of brown whiskers at either end and rows of red spots along its back.



The really serious offender, however, as described by Dr. Beyer, is the larva of the southern flannel moth and its northern variety.

Some of the spines of this species are hollow and connected with a poison secreting cell, the toxic effect of which is extremely virulent. Numbness, severe pain and nausea follow, in the wake of an accidental contact with this caterpillar according to Dr. Beyer. There are records of one or two other varieties with similar effects, he says, but fortunately they are comparatively rare.

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#### ANTI-EVOLUTION BILL DEFEATED BY LOUISIANA SENATE

Modern biology may still be taught in the state of Louisiana as a result of the defeat in the Senate on June 23 of the anti-evolution bill that had been approved previously by the lower house of the state legislature.

The vote killing the anti-evolution bill was 19 to 17, while the favorable vote in the house was 52 to 43.

Several anti-evolution bills were introduced into the legislature this session, but the defeated Shattuck bill was the only one reported out by the committee on public education. It is expected therefore that this will end the agitation for laws restricting science teaching in this state for this session at least.

The bill defeated would have made it unlawful to teach that man ascended or descended from a lower form of animal life and would have required the revision of text books. It is similar to the Tennessee enactment being tested by the Scopes case now before the Tennessee Supreme Court. Mississippi, neighbor state of Louisiana, is the only other state that has an anti-evolution law on its statute books.

Anti-evolutionists conducted a lobby for the bill while at a hearing Col. Thomas D. Boyd, president of the Louisiana State University, pointed out the harm that would come to the educational institutions of the state if the bill were passed.

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#### ANCIENT HAWAIIANS ADEQUATELY FED WITHOUT MILK OR GRAIN

Judging from the fine stature of the Hawaiians, it is assumed that their food in prehistoric times must have been of high nutritive value and that it must have constituted in most respects what is now considered an adequate diet, Miss Carey D. Miller, nutrition expert of the University of Hawaii, declared in a paper presented to the Hawaiian Academy of Science.

"While no attempt is made to deny the influence of heredity on the stature and build of a people", Miss Miller said, "students of nutrition, have given convincing proof of the effect of food on the physical well-being, and they can assert that fine stature in a race or unmixed group of people is due to good food over a long period of time while, conversely, poor physical make-up is due to poor food over

many generations.

"The food habits of the Hawaiians when the islands were discovered were probably what they had been for centuries, at least since about 1100 A.D., and, probably from 600 A.D. to the time of the great migration -- or perhaps even since soon after 1 A.D. or thereabouts which is considered to be somewhere near the year of the arrival of the first inhabitants.

"The Hawaiians ate 138 kinds of edible fish", Miss Miller said, "31 fowls, breadfruit, ferns, bananas, yams, taro, poi, pandanus, and various types of seaweeds. Their diet differed from that of other fine races in that they had no milk, no cod liver oil, and no whole grains."

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#### HITTITES AMONG FIRST USERS OF IRON

The peoples of the near East were among the earliest manufacturers of iron, according to Dr. J. Newton Friend in an address before the members of the Royal Institution.

In 1300 B.C. the Hittites were using iron weapons in their numerous wars and among the treasures of early history preserved to posterity is a letter thought to have been addressed to Rameses II of Egypt from the Hittite king, saying that he is sending with the communication an iron dagger.

The Romans were skilled metallurgists with considerable knowledge of how to handle iron ores. Virgil's Aeneid written around 40 B. C. contains an account of a smithy in full blast, and Pliny in his Natural History, which was brought out in 77 A.D., shows an equal familiarity with the working of the metal. An iron ring recently unearthed from a Roman site was evidently made by soldering together the ends of a bent strip of iron with some sort of copper alloy.

Cast iron, said Dr. Friend, was first known in Sussex in 1350 and soon became fairly common.

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#### ETHYLENE GAS USED TO RIPEN FRUITS

Ethylene gas which has seen recent favor in medical circles as an anesthetic has found quite a different use in the artificial ripening of green fruits and vegetables.

Experiments undertaken at the Agricultural College of the University of Minnesota in cooperation with two wholesale fruit houses demonstrated that green bananas and tomatoes exposed to small proportions of ethylene gas ripened in a shorter time and with much smaller loss than in the usual course of commercial ripening. The flavor was found to be a considerable improvement over that customarily found in fruits ripened off the tree or vine. This is ascribed by Dr. R. B. Harvey to the

fact that ethylene increases the sugar content of the fruits exposed to it.

Experiments are in progress to ascertain the possibilities of ethylene with other fruits such as melons, pineapples, and peaches that have to be picked green to stand shipping to northern countries. Certain varieties of apples and even rhubarb are said to be greatly improved by the treatment.

Since ethylene is simple to administer and comparatively inexpensive Dr. Harvey says that it has distinct commercial possibilities, particularly in the northern states that cannot hope to obtain a naturally ripened product.

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#### WINTER SAP OF EVERGREENS TOO THICK TO BE FROZEN

Why do the leaves of evergreens hang on all winter long, when by rights they should be frozen and drop off? According to researches of Dr. Floyd W. Gail of the University of Idaho, they stick because in winter their sap becomes too thick to freeze.

Dr. Gail gathered leaves from pine trees and from broad-leaved evergreen shrubs once every month through three years, crushed out the sap and tested it for its freezing points. He found that during the summer when the weather is warm and the sap flows freely it is relatively thin and could be frozen easily if there were any frost to freeze it. But as fall comes the starch in the leaves is converted into sugars and oil, changing the sap from a thin and watery fluid into a sort of sirupy emulsion, very difficult to freeze. He found that the greatest density of the sap was reached during late January and February, when the most severe freezing weather occurs. Deciduous trees, that lose their leaves in autumn, show some thickening up of the sap, but apparently the sugars are transferred into the tree before the leaves drop off, for Dr. Gail found that the sap pressed from leaves that had just fallen was easily frozen, whereas sap from leaves not quite ready to fall resisted the effects of considerably lower temperatures.

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#### ANCIENT PLANT REMAINS FOUND IN COAL WASTE

Coal balls, hard, unburnable lumps usually discarded as waste at the mines, are being made to tell new stories of the plant life of America many millions of years ago, when the great deposits of coal were in the making. Dr. A.C. Noe of the University of Chicago has gathered a large collection of these curious objects, from which thin sections are being ground for microscopic examination. Many plants hitherto known only from the prints they left in the mud when they fell and decayed ages ago can now be studied in fine detail.

In the forthcoming issue of the Botanical Gazette, Freda D. Reed of Earlham College, Indiana, tells of the microscopic examination of a single one of these coal balls, which yielded specimens of four different genera of plants. They included a sort of climbing fern now extinct, a plant with some primitive suggestions of the structure of modern evergreens, a relative of the horsetails or scouring-rushes, and what appears to be an ancestral form of the present-day club mosses.

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## PHOENICIAN RING FOUND IN TOMB IN MALTA

A curious double ring of pure gold that probably was a factor in some of the Wall Street deals of the ancient Phoenicians, has just been found in a rock hewn tomb on the island of Malta. Twelve indentations on each side fit the two hoops together perfectly, it is said in a report to the Archaeological Institute of America, and help form the design of a complete sea-going galley.

Its probable Phoenician origin suggests, since the Phoenicians were the merchants of the early Mediterranean world, that it was used in sending confidential dispatches of a business nature. In those days of precarious communication one-half would probably be carried by a trusty messenger along with important letters to the owner's confidential agent who on recognizing and matching the ring would accept it as the bearer's identification.

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## URGES QUOTA LAW WAIVED FOR TALENTED IMMIGRANTS

Should the bars of the immigration quota law be let down to admit foreigners of outstanding promise or talent into the United States? This proposal that it might be advisable to ignore geography in the case of unusually brilliant individuals who want to come into this country is made by Dr. Carl C. Brigham, associate professor of psychology at Princeton University.

Dr. Brigham has for some time been engaged in the development of mental tests for use with immigrants. In a report on the progress of this work, to appear shortly in *Industrial Psychology*, he points out that such tests might be put to good use in spotting gifted immigrants, and that by a slight revision of the quota law this country "would be assured of a constant supply of men and women of exceptional value."

The chief problem now confronting psychologists who are devising tests for foreigners is to make the instructions given by the examiner clear to people speaking all sorts of languages and dialects. Experimenters are trying to avoid the use of language altogether in testing the mentality of foreigners, Dr. Brigham states, and are using pantomime instructions only. That language is not necessary in psychological experiments has been proved, he says, by animal experiments which have regularly been carried on without discourse between the human experimenter and the animal he observes.

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Sunflower seed oil has many uses.

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Nearly half of Idaho is forest land.

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## NEW ELECTRIC LIGHT BURNS WEEK FOR TWO CENTS

A new form of electric light that uses so little current that if burned steadily for a week the electricity costs less than two cents was an important development of the past year, according to a report to the American Institute of Electrical Engineers.

The new lamp, which is intended more for indicator or marker purposes than for general illumination, is known as the "Moore gaseous conductor lamp", after its inventor, and contains a mixture of the rare atmospheric gases Helium, neon and argon. Inside the bulb are two electrodes, with no metallic connection between them, but when the current is turned on the gas glows around one of them, or both, if the current is alternating.

While the actual candlepower of the lamp is very low, about one two-hundredth of a candle, its low current consumption permits it to be used as an indicator on an electric iron to tell when the current is on. Or it can be placed in an electric switch to facilitate finding it in the dark. Another advantage of the lamp is that unlike the ordinary incandescent lamp, which continues to glow for a moment after the electricity has been turned off, the new lamp goes on and off instantly. This quality is a necessary requisite of lamps for certain scientific uses and this type of lamp is used in apparatus for telephoning photographs. The lamp at the receiving end, throwing light on the photographic film must vary precisely as the current supply is increased or diminished by the light sensitive photoelectric cell at the transmitting end.

Among the other recent developments in electric lighting cited were the use of half billion candlepower searchlights, visible for 150 miles, as beacons for the air mail at night; the scientific study of lighting changes and industrial production, sponsored by the National Research Council; and the greater attention being given to specialized training for illumination experts.

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## THINKS FLYING BEST ANTIDOTE FOR AVIATORS' NERVOUS SHOCKS

Turning the other cheek has been found to be the best policy for aviators who have suffered from nervous shock in airplane disasters, according to Dr. H. Meier-Mueller, chief surgeon of the Swiss Aviation Corps, who has himself crashed several times.

The best way to avoid bad mental after-effects is to return the patient to his occupation as speedily as possible after an accident, Dr. Meier-Mueller said. He claims success for this Spartan treatment even with men whose skulls had been fractured more than once. It is the excessively long period of several minutes which elapses between the realization of the coming disaster and the actual crash, which is liable to cause mental upset later, he explained. A violent reaction usually follows a day or so of euphoria. The men are much better off, mentally, financially and otherwise, back in the service, than with a disability pension, he claims.

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## UNIVERSITY OF CHICAGO HONORS ROYAL SCIENTIST

Crown Prince Gustavus Adolphus, of Sweden, famous in scientific circles for his work in archeology, was honored by the University of Chicago. At a special convocation, the degree of Doctor of Laws was conferred on the royal scientist.

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## CANCER NOT HEREDITARY, STATISTICS INDICATE

That cancer does not appear to run in families is the story read in statistics gathered from over 1,200 cancer patients in two representative cities. A first report on these statistics was presented by the Committee on Cancer and Heredity before the Eugenics Research Association at its session here today.

That the investigation is still in preliminary stages and is to be continued was emphasized by Dr. Frederick L. Hoffman, well known statistician and chairman of the committee.

Out of 600 patients interviewed in San Francisco, he said, 20 men and 30 women know of other cases of cancer in their families. In Buffalo, 600 patients were interviewed at a state institution, and 34 men and 4 women told of other cases in the family. In very few of these other family cases was the cancer in the same part or organ of the body as the patient's disease.

In most of the instances where other members of a family had been affected by cancer, only one other case was reported, though in four families there had been three other cases, and in one family four cases.

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## WHITE INDIANS SEEN IN PANAMA IN 1679

The "white" Indians of Darien that have caused so much controversy in scientific circles were observed as early as 1679 according to a reference just unearthed by Dr. Maynard M. Metcalf of Johns Hopkins University.

This early volume, published in Dutch in 1699, was the work of one Alexander Esquemeling, a buccaneer who served as opportunity offered both the English and the French and between times turned historian. In his "Buccaneers of America" he records that in 1679 his ship touched at the islands of Zambles which lie a little to the west of the River Darien where he notes that several of the Indians were "fairer than the fairest of Europe" with hair as light as flax.

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Some Eskimos have as many as 20 names.

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## CLAIMS PLANT-ANIMAL CAUSES MOSAIC DISEASE IN TOBACCO

Mycetozoa, creeping naked bits of protoplasm that are neither plant nor animal but partake of the nature of both, have been added to the list of alleged causes of the serious and highly expensive mosaic disease of tobacco and other plants. In a recent issue of the Botanical Gazette, Philip M. Jones, who has been carrying on his researches at the University of Chicago, states his reasons for believing that he has found the causal organism of this disease, for which botanists are seeking as eagerly as medical scientists are hunting for the cause of cancer.

Mr. Jones claims that he has found this microscopic bit of life passing through a series of half-a-dozen or more disguises both in the tissues of tobacco leaves mottled with the disease and in the digestive tracts of the insects which are believed to be the carriers of the plague. He states that he has been able to grow pure cultures of the organism in sterile nutrient solutions.

In some of the organisms which Mr. Jones examined with his microscope, he says that he saw exceedingly tiny objects which he suggests may be parasites of the parasites, and therefore friends of the plant cultivator because they are enemies of his enemies.

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## TABLOID BOOK REVIEW

FAMOUS MEN OF SCIENCE. By Sarah K. Bolton. Revised and enlarged edition, Illustrated, New York. Thomas Y. Crowell. 1926. \$2.00.

We have here an intimate series of portraits of many of the men famous in various branches of scientific work from Copernicus to Kelvin. The biographies are arranged chronologically, an arrangement nicely adapted to bringing out the conditions characteristic of different stages of the general progress of science and civilization under which scientific work has gone forward. Mrs. Bolton has a knack of making living pictures of the persons she presents, dwelling upon the everyday circumstances of their lives, their relationships and idiosyncrasies and suggesting mood and personality with vividness.

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THE BACTERIOPHAGE AND ITS BEHAVIOR. By F. d'Herrelle, M.D. Translated by George H. Smith, Ph.D. Baltimore; Williams and Wilkins. \$8.00.

This is a fundamental treatise that explains the new science of bacteriophagy of which d'Herrelle is the founder. The present knowledge of the ultramicroscopic organisms which d'Herrelle believes to be a vital factor in the combatting and treatment of a large variety of diseases is still in its beginnings, but this volume probably ranks as a fundamental publication along with the works of Pasteur.

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A rope is stronger when wet than when dry.

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